SHOULD PHARMACY AND CHEMISTRY SPEAK THE SAME LANGUAGE?

With Special Reference to the Nomenclature of Alkaloidal Salts

BY

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By Seward W. Williams, Ph.C., F.C.S.

AS new remedies multiply nomenclatural confusion increases. This disorder is particularly noticeable in the case of alkaloidal salts. Let us take two up-to-date works and make some comparisons.

"The Newer Remedies" (1896), by Prof. Coblentz, on p. 45, under the heading "Iodic Acid and Its Compounds," mentions the following salts:

(INORGANIC)	(ORGANIC)
Sodium Iodate, $NaIO^3$.	Quinine Hydro-iodate, $C^{20}H^{24}N^2O^2HIO^3$.
Potassium Iodate	Codeine Hydro-iodate
Silver Iodate	Hyoscine Hydro-iodate
Lithium Iodate	Atropine Hydro-iodate
Mercuric Iodate	Strychnine Hydro-iodate

Iodic acid (hydrogen iodate) combines with the inorganic bases to form substitution products called iodates, the hydrogen of the combining acid being replaced by the base. The same hydrogen iodate combines with alkaloids to form "addition products" in which the hydrogen of the acid is not replaced by the base. These latter salts

are very naturally and correctly termed hydro-iodates in recognition of the unreplaced hydrogen.

Now let us look at that most carefully edited work, "Merck's 1896 Index," and we find that, while there is strict agreement in the case of inorganic salts, the term hydro-iodate is used for alkaloidal salts formed by hydriodic acid (hydrogen iodide). We may tabulate an example of the nomenclature and notation employed in the two books as follows:

Notation of "The Newer Remedies"	Nomenclature of both "The Newer Remedies" and "Merck's 1896 Index"	Notation of "Merck's 1896 Index"
(Salt of Iodic Acid)		(Salt of Hydriodic Acid)
$C_{20}H_{24}N_2O_2HIO_3$	Quinine Hydro-iodate	$C_{20}H_{24}N_2O_2HI$

(Agreement in name, disagreement in formula.)

Nomenclature of "The Newer Remedies"	Notation of both "The Newer Remedies" and "Merck's 1896 Index"	Nomenclature of "Merck's 1896 Index"
	(Salt of Iodic Acid)	
Quinine Hydro-iodate	$C_{20}H_{24}N_2O_2HIO_3$	Quinine Iodate

(Agreement in formula, disagreement in name.)

It may be urged that "The Newer Remedies" has over-stepped even chemical usage in employing terms which recognize the unreplaced hydrogen in oxyacid salts of the alkaloids, and it is true that most chemical authorities have confined the hydro prefix to hydracid salts. Thus in modern chemical literature we find the term quinine hydriodide for the salt with HI and quinine iodate for the salt with HIO^3. There seems to be just as much reason,

however, for expressing the retention of hydrogen in the salt in one case as in the other, and "The Newer Remedies" may be credited with pioneering a perfectly correct terminology for oxyacid alkaloidal salts.

Will others dare follow? To do so means to use, for salts formed with chloric, bromic and iodic acids, terms which, for many years prior to 1880, were almost universally employed in chemical literature for corresponding salts of hydrochloric, hydrobromic, and hydriodic acids, and which since that time have been perpetuated by the Pharmacopoeia, although generally abandoned by chemists. It means also that old terms like morphine sulphate and strychnine nitrate should be morphine hydrosulphate and strychnine hydronitrate. The question is: Shall expediency yield to exactness?

Modern chemical and pharmaceutical authorities may be more fairly said to disagree on the nomenclature of hydracid alkaloidal salts. Thus we have the chemical societies of England and America, and most modern chemical literature, on the side of the termination ide—for example, hydrobromide—and the Pharmacopoeias of England and America using the ending ate—for instance, hydrobromate.

To illustrate, we may again compare the two books referred to, as follows:

Nomenclature of "Merck's 1896 Index" Agreeing with terminology of the United States and British Pharmacopoeias	The Salt Named	Nomenclature of "The Newer Remedies" (Agreeing in this case with Rules of English and American Chemical Societies)
Hydrastinine Hydrochlor*ate*	$C_{11}H_{11}NO_2HCl$	Hydrastinine Hydrochlor*ide*

The nomenclature of "The Newer Remedies" is largely that of commercial usage, thus affording examples of both pharmacopoeial and chemical terminology, as for instance hydrastine hydrochlorate and tropa-cocaine hydrochloride—both salts of hydrochloric acid.

To build anew would be easy. To correct established errors without some confusion is difficult. Expediency points to restricting the hydro prefix to hydracid salts.

AGREEMENT, UPON THINGS TO BE NAMED, IMPORTANT.

In discussing nomenclature we must agree upon the things to be named. For the sake of argument let us consider that the present notation of alkaloidal salts, accepted by both chemistry and pharmacy, is correct; for example, that the salt formed by quinine with hydrobromic acid is properly designated by the formula $C^{20}H^{24}N^2O^2$ HBr instead of $C^{20}H^{25}N^2O^2Br$, as would be the case if the ammonium theory were applied to alkaloidal salts.

It has been shown that two up-to-date works give the same name to different things and different names to the same

thing. The reason, however, is clear. Merck's Index naturally and properly uses the language of pharmacy, and the book will be found to conform strictly with the nomenclature of the Pharmacopoeia. "The Newer Remedies" deals almost entirely with articles not pharmacopoeial, and, doubtless in anticipation of changes in pharmacopoeial terminology prior to salts named becoming official, employs terms consistent with the rules of modern chemistry, where custom has not established other usage.

Both books are correct, hence the pertinence of our query: "Should pharmacy and chemistry speak the same language?"

The A. Ph. A. Committee on Pharmacopoeial Recommendations evidently believes that pharmacy should adopt the language of chemistry where practicable.

ADVICE OF THE A. PH. A. COMMITTEE

The Committee on Revision of the American Pharmaceutical Association said at the Denver meeting (1895): "Hydrochlorate and Hydrobromate, as representing salts of hydrochloric and hydrobromic acids, are incorrect, and should be hydrochloride and hydrobromide. * * * Hydrastine hydrochloride should be made official." * * *

The writer trusts that the report of the A. Ph. A. Committee will be adopted by the Committee of Revision; but similar efforts

have been made before without avail and history may repeat itself.

SIMILAR EFFORTS TWELVE YEARS AGO

Back in 1884 the "Weekly Drug News" went into this question of terminology very thoroughly. In the course of an editorial on "What is the correct name for the (then) new local anaesthetic," the "News" said:

Several salts, formed by the union of alkaloids with hydrochloric acid, are coming into very general use, under a change in pharmacopeial nomenclature, and the names now given them will naturally become deeply rooted in trade and professional terminology. This is notably the case with the new local anaesthetic (not yet pharmacopoeial). We think that "hydrochloride" gives a clearer idea of the composition of one of these salts than any term ever employed, and therefore, call the new anaesthetic cocaine hydrochloride. * * * Our main argument against the use of "hydrochlorate" for expressing salts formed with hydrochloric acid and the alkaloids, is that the name rightfully belongs to the rarer compounds with chloric acid. * * * For a perfect nomenclature we think the prefix "hydro" should be retained, as it distinguishes an "addition" from a "substitution" product. * * * To follow out this reasoning, "quinine sulphate" should, of course, be termed "quinine hydrosulphate" (hydrosulphate is obsolete for sulphide), "quinine nitrate" would be "quinine hydronitrate," etc. If it should not be decided best to make such changes, we think, for the sake of uniformity, that all salts formed with hydrochloric acid should be termed "chlorides," * * * As we have stated before, and for reasons substantially as given above, we prefer "hydrobromide" to "hydrobromate," as the name of an

"addition product" with hydrobromic acid, and use "hydriodide" for "hydriodate" when speaking of an "addition product" with hydriodic acid. * * *

The question was later laid before twenty-seven of the best chemical and pharmaceutical authorities, with the result that, as between hydrochloride and hydrochlorate, nearly all favored the former, a number, however, suggesting terms based on the ammonium theory, as, for example, "coconium chloride," "cocainum chloride," "hydrococaine chloride," etc.

Brief extracts from the comprehensive letters received by the "Drug News," seem proper even at this late day.

BRIEF REVIEW OF THE SYMPOSIUM OF 1884

Dr. A. B. Prescott, University of Michigan:

* * * You recommend that the change in the word-ending for these salts, from -ate to -ide, a change already made and being made in the language of chemists, be adopted in the language of pharmacists. It is well that the use of terms in pharmaceutical commerce shall not fall far behind the use of terms in chemical science. In fact, the closer are all the relations between applied science and pure science, the better it is for the progress of each. The world of manufacture and of use stimulates, and is strengthened by, the world of investigation and discovery.

Wolcott Gibbs, Rumford, Professor of Chemistry, Harvard University:

* * * I should myself prefer to call it the hydrochloride of cocaine, adopting the nomen-

clature proposed some years ago in England, I believe, by Prof. Foster.

John Howard Appleton, Professor of Chemistry, Brown University:

My personal feeling is that the new local anaesthetic had better have the word hydrochloride than hydrochlorate as a part of its name. * * *

A. A. Breneman, formerly Professor of Industrial Chemistry, Cornell University:

* * * My own preference, therefore, would be for the term "hydrochloride of cocaine," or, rather, in accordance with present usage, cocaine hydrochloride to designate the new remedy, and as a typical name for compounds of this class. I cannot think that usage in favor of the term "hydrochlorate" is yet so firmly established as to forbid a change so desirable. * * *

John M. Maisch, at the time Professor of Materia Medica and Botany, Philadelphia College of Pharmacy:

* * * As far as my personal preference is concerned, I am rather in favor of hydrochloride as a good descriptive term for salts containing the hydrogen compounds of halogens; therefore, hydrobromide, hydrocyanide, etc.; it is analogous to chloride for compounds containing Cl.

Henry B. Parsons, Ph.C., at the time editor of the Druggists Circular:

* * * The alkaloidal salts of hydrochloric, hydrobromic and hydriodic acids are, therefore, hydrochlorides, hydrobromides and hydriodides. * * *

Ira Remsen, Professor of Chemistry, Johns Hopkins University:

I prefer the name "hydrochloride" to "hydrochlorate" for salts like hydrochloride of co-

caine. * * * Such names as hydrococaine chloride, hydroquinine nitrate, etc. (based on ammonium theory) would be best, and, save that they are new, they are entirely unobjectionable. * * *

Prof. William H. Greene, of Philadelphia:

* * * The word hydrochlorate—a direct translation of the French chlorhydrate—is, without doubt, objectionable for a compound which is not, in any manner, a hydrate or a chlorate. * * *

Dr. D. K. Shute, Washington, D. C.:

* * * Your argument against the term "hydrochlorate" is very conclusive. * * * I cannot agree with you, however, that "hydrochloride" is more correct than chloride, and therefore preferable to it. * * *

(Dr. Shute's argument for chloride was based on the ammonium theory.)

Samuel W. Johnson, Professor of Chemistry, Yale University:

The name hydrochlorate of cocaine is correct, as is also the term hydrochlorate of ammonia. These are both correct, because chemists long ago adopted, and now employ them. * * *

H. A. Mott, Ph.D., at the time consulting chemist, New York:

* * * The compound $C^{17}H^{21}NO^4.HCl$ can only be correctly represented by the name cocaine hydrochloride; the ending "chlorate" is very misleading, and should not be employed.

William Rupp, F.C.S., at the time consulting chemist, New York:

* * * For some years I have always used the term hydrochloride, when speaking of the class of salts in question, and am, therefore,

fully in accord with the majority of opinions expressed. * * *

Maurice Perkins, Professor of Chemistry, Union College:

I think the termination "ide" much better than "ate," for this latter would seem to indicate that the acid radical contained oxygen, which it does not.

Joseph P. Remington, Professor of Pharmacy, Philadelphia College of Pharmacy:

* * * My own view is that combinations of the hydracids with alkaloids are properly termed hydrochlorides, etc. * * *

N. T. Lupton, Professor of Chemistry, Vanderbilt University:

* * * My personal preference is to call such compounds chlorides, and not hydrochlorides, but, as stated above, I follow the usage of the Chemical Society of England and call the compound formed by the action of hydrochloric acid on cocaine cocaine hydrochloride.

P. T. Austen, at the time Professor of General and Applied Chemistry, Rutgers College:

* * * The addition compound of cocaine with hydrochloric acid is properly called cocaine hydrochloride.

Sidney A. Norton, Professor of Chemistry, Ohio State University:

Your editorial seems to fill the bill, and to show that cocaine hydrochloride is the best name. * * *

George F. Barker, Professor of Chemistry, University of Pennsylvania:

* * * My judgment, therefore, is: First, that the term "hydrochlorate" is entirely inadmissi-

ble, having neither precedent, analogy or sound reason in its favor; second, that the term "hydrochloride" is anomalous and unscientific, though preferable to "hydrochlorate," and third, that, in accordance with the spirit of the Lavoisierian nomenclature, the term "cocainum chloride" is to be recommended as having most points in its favor.

Wallace Goold Levison, Professor of Chemistry, Cooper Union, New York:

Until the constitution of the compound formed by the reaction between cocaine, $C^{17}H^{21}NO^4$, and hydric chloride, HCl, is determined, I am inclined to accord with the majority * * * and call it cocaine hydrochloride. * * *

Dr. A. B. Lyons, at the time chemist with Parke, Davis & Co., Detroit:

* * * Cocaine chloride I decidedly prefer, as being in harmony with our mode of naming metallic salts, and consistent with cocaine sulphate, which nearly all chemists unqualifiedly sustain.

I would give the name cocaine to the radical which, by its direct union with chlorine, forms the chloride, * * * and, if necessary, would distinguish as cocaine alkaloid the compound ammonia, commonly designated simply as cocaine.

(Dr. Lyons also suggested the reinstatement of the old termination ia for the uncombined alkaloid, retaining ine for the alkaloid in combination, as for example strychnia and strychnine chloride. He presented a most able defense of the ammonium theory.)

Frederick B. Power, at the time Professor of Pharmacy, University of Wisconsin:

* * * Personally, I should consider the expression hydrochloride more correct than hydrochlorate, as applied to the combination of an alkaloid with hydrochloric acid. * * *

Charles A. Doremus, Professor of Chemistry, Bellevue Hospital Medical College:

I prefer the term cocaine hydrochloride, though the salts of the alkaloids with hydrochloric acid are termed hydrochlorates by many eminent chemists, and have, therefore, the sanction of authority. * * *

Oscar Oldberg, Professor of Pharmacy, Northwestern University:

* * * It is at least consistent to say cocaine chloride when we say morphine sulphate. In a paper read before the American Pharmaceutical Association, and also in a report to the Pharmacopoeial Revision Committee, the writer recommended in 1880, that the salts of the alkaloids be named chlorides, sulphates, etc., for the sake of consistency. * * *

Dr. Lawrence Wolff, of Philadelphia:

* * * Chemically, Prof. Remsen's proposed term seems to me eminently proper, and for pharmaceutical or medical convenience, if a misnomer has to be used, I should think, for brevity's sake, "cocaine chloride" would answer best, although, of the two terms hydrochlorate and hydrochloride, I should certainly prefer the latter as the more correct.

F. W. Clarke, chemist at the Smithsonian Institution, Washington:

* * * I prefer to use either "hydrochlorate" or "hydrochloride." "Chloride" is bad, because it ignores the hydrogen, which is essential to the compounds. * * *

Prof. John Attfield, London:

* * * There is much to be said for the words of which "hydrochloride" is an example, and nothing but good to all interests concerned is likely to come out of a discussion on chemical nomenclature in your columns; but do not add to the jumble by any serious endeavor to make alterations which would, for instance, involve the calling of a certain old friend universally known as "sulphate of quinine" by a name having such misleading and unpleasant associations as "hydrosulphate of quinine." * * *

Prof. J. U. Lloyd, Cincinnati:

First. If an alkaloid unites with HCl, so that the hydrogen is separated from the chlorine, which then acts as a radical, according to present usage, the compound should properly be called a chloride.

Second. If the combination HCl is known under the name of hydrochloric acid, and, if it is the custom to call compounds of this acid in which the entire undecomposed acid is involved by the name hydrochlorate (as I think most writers now use it), then the union of cocaine and HCl could be called hydrochlorate of cocaine.

Third. If the combination HCl is regarded as hydric chloride, or chloride of hydrogen, and the undecomposed compound HCl is supposed to unite with the alkaloid, I do not see why the term cocaine hydrochloride is not in conformity with our ordinary nomenclature.

THE PHARMACOPOEIA'S REASON WHY

Through the kindness of the highest authority the writer is able to say that the reason why the Committee of Revision held to "hydrochlorate" was because they found it impossible to carry out the nomenclature, requiring "hydrochloride"

uniformly. If the term morphine hydrochloride, for example, were used, consistency would require morphine sulphate to be called morphine hydrosulphate, the term being understood by many to indicate a derivative of hydrosulphuric acid; this extension of the use of the hydro prefix involving such names also as hydrophosphate, hydrocitrate, etc. Their aim was to avoid confusion in medicinal chemicals. To quote: "It is not wise to carry the refinements of chemical nomenclature—which will be quite appropriate for scientific chemical laboratory and writings—into the dispensing pharmacy. Better a somewhat antiquated title than a confusion among physicians and dispensers."

A review of the introduction of alkaloidal salts into the U. S. Pharmacopoeia is interesting in this connection.

NAMES UNDER WHICH ALKALOIDAL SALTS HAVE APPEARED IN THE U. S. P.

1820—None.

Revision of 1830 (31)—Acetate of morphia, sulphate of morphia, sulphate of quinia.

1840—Acetate of morphia, sulphate of morphia, sulphate of quinia.

1850—Acetate of morphia, muriate of morphia, sulphate of morphia, sulphate of quinia.

1860—Acetate of morphia, muriate of

morphia; sulphates of atropia, cinchonia, morphia, quinia and strychnia, and valerianate of quinia.

1870—Acetate of morphia, muriate of morphia, citrate of (iron and) quinia, citrate of (iron and) strychnia, sulphates of atropia, cinchonia, morphia, quinia and strychnia, and valerianate of quinia.

1880—Acetate of morphine, bisulphate of quinine, citrate of (iron and) quinine, citrate of (iron and) strychnine, hydrobromate of quinine, hydrochlorates of apomorphine, morphine, pilocarpine and quinine; sulphates of atropine, cinchonidine, cinchonine, hyoscyamine, morphine, quinidine, quinine and strychnine; oleate of veratrine, salicylate of physostigmine, and valerianate of quinine.

1890—Morphine acetate, apomorphine, cocaine, hydrastinine, morphine, pilocarpine and quinine hydrochlorates; hyoscine, hyoscyamine and quinine hydrobromates; atropine, cinchonidine, cinchonine, hyoscyamine, morphine, physostigmine, quinidine, quinine, sparteine and strychnine sulphates; physostigmine salicylate, quinine valerianate, veratrine oleate.

Thus it is shown that so far as the U. S. P. is concerned the term hydrochlorate was a new name in the revision of 1880. But the radical change from "muriate," a word of seven letters, to hydrochlorate, a word of thirteen letters, was made without an idea

of serious confusion. Surely then a change to hydrochloride, involving but two letters, should occasion no confusion at all.

In the "Companion to the U. S. Pharmacopoeia" (1884) we find, for example, the following: Hydrochlorate of morphine (morphinae murias, muriate of morphine, chloride of morphine).

The only term of the class to which hydrochlorate belongs, which is to be found in the U. S. P. prior to 1880, is hydriodate, which, in the name hydriodate of potassa, appeared as a synonym for iodide of potassium in the revisions of 1830 and 1840, being dropped in 1850.

ATTITUDE OF FOREIGN PHARMACOPOEIAS AS SHOWN BY REPRESENTATIVE TERMS

Taking hydrochlorate as a representative name, we find that it has been used in the British Pharmacopoeia for alkaloidal salts formed by hydrochloric acid (hydrogen chloride) for the last thirty years.

German Pharmacopoeia (second edition, 1883)—Morphinum hydrochloricum (hydrochlorate of morphine, morphin-hydrochlorat.)

Commentary on the last (third edition) of the German Pharmacopoeia—Cocainum hydrochloricum (Cocaïn hydrochlorid, cocaïnchlorhydrat, salzsaures cocaïn, chlorhydrate de cocaine, hydrochlorate of cocaine. (The authors themselves use the term

cocaïn hydrochlorid in describing the salt. In orthography hydrochlorid agrees with the rules adopted by the Association for the Advancement of Science a few years since, and may naturally be the term of the future.)

French Codex—Chlorhydrate de morphine (hydrochlorate de morphine, chlorhydras morphicus).

Austrian Pharmacopoeia — Morphinum hydrochloricum (old terms morphiae murias, morphium hydrochloricum, morphium muriaticum).

Belgian Pharmacopoeia—Hydrochlorate de morphine (chlorhydrate morphique).

Hungarian Pharmacopoeia—Morphinum hydrochloricum (morphinhydrochlorat).

Pharmacopoeia of the Netherlands—Hydrochloras cocaini (cocainehydrochloraat).

This diversity presents a strong argument for Latin as the universal language of pharmacy, to be used in synonyms on labels in all countries.

To an authority for years perfectly familiar with the pharmacopoeias of all nations and as well thoroughly conversant with the literature of chemistry long prior to 1880, the terms hydrochlorate and hydrobromate would appear to be indicated as proper names both by precedent and for the sake of conformity with foreign pharmacopoeias. The action of the U. S. P. Committee of Revision in 1880 was therefore a perfectly natural one under the circumstances.

On examining chemical works recently published it is found that, with rare exceptions, the rules of the English Chemical Society are followed. Thus, Watt's Dictionary (1893), Thorpe's Dictionary of Applied Chemistry (1893), Bloxam's Chemistry (1895), Nernst's Theoretical Chemistry (1895), Watt's Manual of Chemistry (1886), Perkin and Kipping's Organic Chemistry (1895), Fowne's Manual of Chemistry (1895), Wurtz's Elements of Chemistry (1895), Lassar-Cohn's Manual of Organic Chemistry (1895), Pinner's Organic Chemistry, Remsen's Organic Chemistry (1894), Prescott's Organic Analysis (1895), Allen's Commercial Organic Analysis (1892), and Bernthsen's Organic Chemistry (1896) accord with the terminology which gives alkaloidal salts of the hydracids such names as hydrochloride, hydrobromide, and hydriodide.

The rules of the London Chemical Society say: "The compounds of basic substances, with hydrogen chloride, bromide, or iodide should always receive the names ending in ide and not in ate, as morphine hydrochloride and not morphine hydrochlorate." *

The eminent authority, Prof. Attfield, as before noted, is not, however, inclined to give up such terms as hydrochlorate.

* *Journal of the Chemical Society.* (London), 1879, Vol. xxxv, p. 281.

Pharmaceutical literature in the main conforms to the nomenclature of the Pharmacopoeia, as would be expected. Heebner's "Manual of Pharmacy and Pharmaceutical Chemistry" (1887), however, says:

When forming salts, the alkaloids do not replace the hydrogen of acids; consequently, the terms sulphate, chloride, etc., are incorrect when applied to an alkaloidal salt, but should be, respectively, hydrosulphate, hydrochloride, etc.

CHEMICAL AUTHORITIES PRIOR TO 1875

In reviewing old works on chemistry, the writer finds that prior to 1875 such terms as hydrochlorate, hydrobromate and hydriodate, were almost universally employed in naming alkaloidal salts of HCl, HBr, and HI. This is found to be the case in old editions of "Watt's Dictionary," and in that other grand work, "Gmelin's Hand Book of Chemistry" (1864).

*"Henry's Chemistry" (1826) uses the term muriate; "Regnault's Chemistry" (1853), chlorhydrate; Miller's (1857) and Naquet's (1868), hydrochlorate; Kane's

*The following is amusing, in connection with subsequent efforts to systematize nomenclature: "Henry's Chemistry" (1826), in speaking of alkaloids as vegetable alkalies, says: "At first these were distinguished by names ending in ine, as morphine, strychnine, etc., but, for the sake of uniformity with the nomenclature of other alkalies, their names have since been modified, and the termination a is now limited to those substances which have alkaline properties, that in ine being applied to vegetable principles which are not alkaline." Tempora mutantur.

(1846), muriate and hydrocyanate; "Wohler's Organic Chemistry" (1873), hydrochlorate; "Storer's Dictionary of Solubilities" (1864), bromhydrate, chlorhydrate, etc.; "Brande and Taylor's Chemistry" (1867), hydrochlorate.

COMMERCIAL USAGE

Many of the large houses label their alkaloidal salts in accord with pharmacopoeial nomenclature, while as many more hold to the usage of twenty years ago. The member of the A. Ph. A. Committee who is responsible for the recommendation to change the termination from ate to ide does not advocate the use on labels of the terms he favors until the change is adopted by the Pharmacopoeia, his own firm using the term hydrochlorate, hydrobromate, etc.

The following letter, from one of the most prominent drug houses, shows that preference for such terms as hydrochloride is made to yield to harmony with pharmacopoeial terminology. It also shows how firmly the old term "muriate" is rooted in medicine and pharmacy:

* * * Our opinion is that the commercial usage should conform to the nomenclature of the U. S. P. We generally follow this rule on our labels. In the case of morphine, however, we generally use the term "muriate," in place of hydrochlorate, as our customers almost invariably order the drug as "muriate." It would seem advisable that some rule should be established in this matter, in order to avoid confusion and variety of labels

From a chemical standpoint, we would favor the use of the words hydrochloride, hydrobromide, etc., as being more correct, and in accordance with chemical nomenclature, than hydrochlorate, hydrobromate, etc., the suffix "ate" being usually appended to salts derived from acids containing oxygen. * * *

Another large house writes:

* * * We are following as far as possible the rules laid lown in the U. S. Pharmacopoeia, and consequently, in many instances both the Latin name and the common name of the article is set forth on the labels. Our quinine hydrobromate label will read as follows: "Quininae hydrobromas—Quinine hydrobromate." * * * We have also added to the cocaine label a third name, by which it is commonly known, namely, Muriate Cocaine. * * *

Taking the commonly used cocaine salt as an example, the following is shown to be the usage of a number of the largest houses in the trade:

Merck & Co.: Cocaine hydrochlorate U. S. P. (cocaine muriate, cocaine hydrochloride); Parke, Davis & Co., E. R. Squibb & Sons, Powers & Weightman, McKesson & Robbins, Sharp & Dohme, Rosengarten & Sons: cocaine hydrochlorate; Schieffelin & Co. and John Wyeth & Bro.: cocaine hydrochlorate, and muriate; Lehn & Fink: cocaine muriate (special list: cocain hydrochlorate); N. Y. Quinine & Chemical Works: cocaine muriate; Mallinckrodt Chemical Works and C. G. Bacon & Co.: cocaine hydrochlorate. The Zimmer, Boehringer and Gehe brands are adver-

tised in this country under the names cocaine muriate, and muriate of cocaine.

Considering the salts of hydrobromic and hydriodic acid, Merck & Co., for example, quote quinine hydrobromate and hydroiodate, morphine hydrobromate and hydroiodate; N. Y. Quinine & Chemical works: quinine bromide, morphine bromide; Rosengarten & Sons: quinine bromide and iodide and morphine bromide; Powers & Weightman: quinine hydrobromate, quinine iodide, and morphine bromide; Lehn & Fink: both quinine bromide and hydrobromate, quinine iodide and morphine bromide; C. G. Bacon & Co.: morphine bromide, quinine hydrobromate, and iodide; Mallinckrodt Chemical Works: quinine hydrobromate, and iodide and strychnine bromide.

A similar lack of uniformity naturally pervades the prices current of the pharmaceutical journals. "Merck's Report:" cocaine hydrochlorate, morphine hydrobromate, quinine hydriodate ("iodide"); "American Druggist:" cocaine hydrochloride, morphine muriate; "Druggists Circular:" cocaine hydroch., morphine muriate; "Oil, Paint and Drug Reporter:" cocaine muriate; "Pharmaceutical Era:" cocaine muriate, quinine muriate; "Western Druggist:" cocaine (no salt specified), quinine muriate; "Bulletin of Pharmacy:" cocaine hydrochlorate, morphia muriate, quinine

muriate; "National Druggist:" cocaine hydrochlorate, morphine bromide and muriate, quinine iodide, muriate and hydrobromate; "New England Druggist:" cocaine hydrochlorate, morphine bromide, and muriate and quinine hydrobromate, iodide and muriate; "Deutsche-Amerikanische Apotheker-Zeitung:" cocainum hydrochl., morphinum muriatic., chininum bromatum and muriat.; "Notes on New Remedies" quotes both quinine hydrobromate and bromide (the former at 10c. advance*), strychnia bromide and muriate, quinine iodide, and muriate, etc.; and the "Pacific Drug Review:" cocaine muriate, morphine bromide, quinine bromide, and hydrobromate in the same list, the latter at an advance of 25 cents, quite a premium on pharmacopoeial terminology.†

One journal conforms strictly with the nomenclature of the Pharmacopoeia in every case. But one uses the term hydrochloride, and this only in the case of the cocaine salt. This is the solitary instance where a name of this class is employed in "prices current," which accords with the usage of modern chemistry.

*† This seemingly peculiar circumstance is presumably explained by the fact that the hydrobromide, being a less important salt than the sulphate, is not repriced as often and with the same care. Thus one manufacturer labeling the salt "bromide" perhaps changes his quotation before another who uses the term hydrobromate.

From a study of price lists and "prices current," it is evident, however, that, if a change were to be made in commercial pharmacy, to a uniform terminology for hydracid alkaloidal salts, none would be more natural or easily effected than that advised by the A. Ph. A. committee. The hydro prefix is shown to be firmly established in commercial usage in the name hydrochlorate, and to a limited extent in the term hydrobromate. The ending ide is well established in the terms bromide and iodide. What uniform system could be adopted that would better harmonize commercial usage than that which calls for hydrochloride, hydrobromide and hydriodide?

CONDITIONS CONFRONTING US

It is seen that chemistry itself has made it impractical to use such terms as hydrochlorate, hydrobromate, and hydriodate for alkaloidal salts of chloric, bromic and iodic acids (hydrogen chlorate, bromate, and iodate), because for many years it established a usage of these very names for salts of hydrochloric, hydrobromic, and hydriodic acids. The best that could be done was to adopt a correct nomenclature for the hydracid salts and leave the terminology of the oxyacid salts unchanged. Thus modern chemistry names the salt of an alkaloid with hydrobromic acid a hydrobromide,

recognizing the unreplaced hydrogen of the combining acid, while the salt of bromic acid (hydrogen bromate) is called a bromate, ignoring the unreplaced hydrogen of the acid. As chemistry had left the terms hydrochlorate, hydrobromate and hydriodate to become obsolete for hydracid salts, they would have eventually become available as correct names for the corresponding oxyacid salts, had not pharmacy taken up the terms just as chemistry abandoned them. These old chemical terms, practically introduced to American pharmacy and medicine by the Pharmacopoeia of 1880, have become firmly established in pharmaceutical literature, and to some extent in commercial usage.

The A. Ph. A. committee now asks for a change. Many advocates of such terms as hydrochlorate do not claim that they are correct; they do not assert that hydrochloride and hydrobromide are incorrect. They simply say they could not carry out the latter terminology uniformly without confusion. The question with them is purely one of consistency and expediency.

CONSISTENCY

If the term hydrochlorate, for example, were chosen instead of chloride because it recognized the unreplaced hydrogen of the combining acid, then it was inconsistent with terms used for the oxyacid salts, as

chlorate, sulphate, etc., which failed to recognize such unreplaced hydrogen. If this were not the idea, and hydrochlorate is regarded as consistent with sulphate, nitrate, etc., then it is inconsistent with the whole nomenclature of metallic salts, and this inconsistency is surely as bad as any involved in the A. Ph. A. recommendations. Consistency has been barred by the perpetuation of terms fairly obsolete in modern chemistry. But granting all this, if we can't be correct, let us be as correct as we can.

A review of Merck's Index shows that there are about 150 remedial agents of the class in question, to which we can give correct names, and this number is rapidly increasing. Why not have the names of this army of hydracid salts correct, even if we must retain defective or rather abbreviated terms for the corresponding oxyacid salts. Pharmacy and chemistry in this matter will then agree.

EXPEDIENCY

Now as to the question of confusion. If it were safe to change muriate to hydrochlorate in 1880 (hydrochlorate while old in chemical usage being practically new in that of prescribing and dispensing), why is it not safe to change hydrochlorate to hydrochloride in 1900? The change of 1880 involved nine new letters, while the

change asked for by the A. Ph. A. committee requires but two.

In conversation with pharmacists of long experience, it was found that they dated the appearance of such terms as hydrochlorate and hydrobromate in prescriptions from the time of their introduction into the Pharmacopoeia of 1880. To them, as dispensing pharmacists, the terms were then practically new ones. As prescriptions speak for the physician, this appears, therefore, to have been true in medical usage. The writer would be interested to hear from readers who have on their files prescriptions calling for hydrochlorates or hydrobromates prior to 1880, with examples, and comments as to the rarity or frequency of such cases.

In considering expediency we may properly view the matter from the prescriber's standpoint. Chemical instruction in our medical colleges is necessarily quite elementary, and rules applying to incompatibilities are made as simple as possible.

Let us suppose that the physician understands thoroughly the incompatibilities of chlorides and chlorates; for example, he knows, that a soluble chloride will precipitate silver nitrate and that a chlorate will not. He wishes to mitigate the pain caused by silver nitrate, and naturally writes a prescription calling for a cocaine salt in combination. Does he

know that the hydrochlorate he is in the habit of prescribing is not a chlorate at all, but a 'chloride? (Ask the first physician you meet and see what he says). The doctor quite naturally prescribes the hydrochlorate, and great is the fall thereof; as silver chloride; that is, unless the dispenser has consulted Merck's Index and uses the nitrate provided for just such a case. Had the doctor known that the hydrochlorate were a hydrochloride he would have looked up a salt of cocaine compatible with silver.

We needn't worry about the pharmacist understanding a legibly written prescription no matter what terminology is employed. But medical chirography is not always Spencerian or otherwise classifiable. It makes little difference to the dispenser whether muriate, chloride, hydrochlorate or hydrochloride is prescribed; but with a choice of four names to abbreviate and disguise, as the prescriber only knows how, the pharmacist is rather at a disadvantage. One name should by common consent be adopted.

It has been pretty well emphasized within the last few months that international agreement may be necessary in determining some questions; but is it in this? Cannot the U. S. P. Committee of Revision act independently in this matter with perfect propriety and safety? A uniform Latin terminology adopted by all Pharmacopoeias

would seem very desirable; but may not, in the case in hand, the English nomenclature of modern chemistry be adopted to our great advantage? The use of both the Latin and English name on labels, as is now the custom of many firms, is to be highly commended.

It were presumption on the writer's part to criticise the authorities who determined the nomenclature of the Pharmacopoeia, and he disclaims any such intent. Their record for wise and prudent action is such as to command not only respect, but endorsement. Present conditions, however, are not those of 1880. Alkaloidal salts of chloric, bromic, and iodic acids were then practically unknown outside the domain of chemistry. Now some are becoming recognized in medicine, and may ere long be clamoring for admission to the Pharmacopoeia. If they are ever to have correct names based on our accepted notation, the sooner hydrochlorate, hydrobromate and hydriodate are allowed to become obsolete as names for hydracid salts the better.

The time, when the terms, applied in the language of pharmacy to hydracid salts, were to be wanted for the corresponding oxyacid salts as presaged by the "Drug News" twelve years ago, has arrived. In proof of this we find representative terms of this class so employed in a recent work*

* "The Newer Remedies," 1896.

designed for the ready reference of physician and pharmacist.

It is uncertain when the determination of the constitution of alkaloidal salts will warrant the application to them of the ammonium theory, which would make the terms chloride, bromide, iodide, etc., correct if distinctive endings were given the combined and uncombined alkaloid.

Is it not better to agree with modern chemistry and be partly right than to sacrifice agreement with chemical usage for the sake of consistency, which at best is inconsistent? Is it not better, too, to agree with the rules of the chemical societies of England and America than to discard the "hydro" prefix entirely by using the terms chloride, bromide, iodide, etc.? The proposition to use these terms, made by one of our ablest teachers and writers, is certainly very consistent and most practical; but isn't it better to be partly right than all wrong?

A SERIO"COMMA"CAL SUGGESTION

But the "hydro" prefix does make long words, and the medical profession dislikes long words except for the purpose of amputation.

'Tis true; 'tis true 'tis pity; and pity 'tis 'tis true.

Are we not "playing 'Hamlet' with Hamlet left out?" Where is the comma Shakes-

peare loved so well? The words 'chloride, 'bromide, and 'iodide should be legitimate contractions for hydrochloride, hydrobromide, and hydriodide. The comma means that something is left out but understood—a usage sanctioned by Webster in rules for contraction. We thus gain consistency and practicability without entirely disregarding the retention in the salt of the hydrogen of the combining acid.

Morphine 'bromide, quinine 'chloride, atropine 'sulphate, strychnine 'nitrate, etc. A "comma"cal sight, this, to the physician. At any rate, he smiles; and why shouldn't he? All these years he has had to content himself with cutting off one end of the word; if he can cut off both ends his cup of joy should overflow.

Let us, however, retain the hydro-prefix in the books, for hydracid salts, removing existing inconsistency in the case of oxyacid salts as far as practicable by means of the comma. In writing the names of hydracid salts we may abbreviate by legitimate contraction where time, space or ink must be economized.

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